



A REVISION OF  
*ATOPOPOMPILUS* ARNOLD, WITH A NOTE  
ON THE IDENTITY OF *ANOPLINELLUS* BANKS  
(HYMENOPTERA : POMPILIDAE)

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By M. C. DAY

## CONTENTS

	<i>Page</i>
SYNOPSIS . . . . .	47
INTRODUCTION . . . . .	47
ACKNOWLEDGEMENTS . . . . .	49
THE IDENTITY OF <i>Anoplinellus</i> BANKS, AND ITS TYPE-SPECIES . . . . .	49
GENUS <i>Atopopompilus</i> ARNOLD . . . . .	51
Key to the species . . . . .	52
Descriptions of the species . . . . .	54
REFERENCES . . . . .	68
INDEX . . . . .	69

## SYNOPSIS

*Anoplinellus* Banks, a genus based on a misidentified type-species, is disposed of as a synonym of *Arachnophroctonus* Howard. *Atopopompilus* Arnold is recalled from synonymy and redefined to include Ethiopian, Malagasy and Oriental species; the males of all species are recognized. Six species are revised and a seventh described as new; a key and distributional data are given. Lectotypes are designated for four nominal species, and type-material of a fifth is presumed lost; eleven new specific synonyms are established.

## INTRODUCTION

VARIOUS groups of Pompilidae exhibit quite substantial sexual dimorphism, and this phenomenon has, on occasion, given rise to considerable taxonomic confusion. New taxa have been established for species or groups of species recognized only from one sex, the other remaining undescribed, or being assigned to other taxa. The genus here revised, *Atopopompilus* Arnold, 1937, is an example of such confusion, as will be clear from this introduction.

Haupt (1929), in his treatment of the genus *Paracyphononyx* Gribodo, 1884, included species of two distinct groups, as is shown by the immediate dichotomy in his keys to females and to males. Arnold (1936) revised the Ethiopian species of *Paracyphononyx*, including the males of both groups keyed by Haupt, but the females only of one group, those most closely related to *P. melanicrus* Gribodo,

1884, type-species of *Paracyphononyx*. In 1937, Arnold proposed *Atopopompilus* for the second group of females. However, males of one group which characteristically have a median carina on the face between and below the antennae, had been associated by Haupt with females of three species, *P. nefas* Dalla Torre, 1897, *P. coloratus* Haupt, 1929, and *P. venans* Kohl, 1894, the last being type-species of *Atopopompilus*. In his revision of *Paracyphononyx*, Arnold (1936) had recognized Haupt's carinate-faced male, *P. affinis* Haupt, 1929, and had placed Haupt's other carinate-faced species in the synonymy of *Pompilus carinatus* Radoszkowski, 1881. In 1937, Arnold stated 'male unknown' after his diagnosis of *Atopopompilus*.

*Atopopompilus* as here discussed includes five Ethiopian and one Malagasy species; a related species occurs in the Oriental and Indonesian regions. Banks (1934) proposed *Anoplinellus* as a genus for this Oriental species, known to him only from females which he misidentified as *Pompilus clotho* Smith, 1879. Van der Vecht (unpublished) correctly associated this female with its male in long series of specimens from Java, identified as the subsequently described *Anoplinellus javanus* Haupt, 1935. The males have a carinate face. A female and male, determined by Van der Vecht, are in the collections of the National Museum of Rhodesia as a result of exchanges between Arnold and Vecht. However, Arnold did not associate the female with *Atopopompilus*, or the male with 'carinate-faced *Paracyphononyx*'.

Haupt (1950) re-assessed *Atopopompilus* and gave a key to the females of the species he recognized. He again referred to a male of *A. venans*, in cursive text, but did not give sufficient information to enable other workers readily to identify it.

Evans (1966), in his revisional study of North and Central American Pompilinae, listed *Atopopompilus* as a synonym of *Paracyphononyx*, and suggested that *Atopopompilus* might ultimately be used as a subgenus within the latter genus. However, Evans based his knowledge of *Atopopompilus* only on female specimens; his diagnosis of *Paracyphononyx* does not include carinate-faced males. Neotropical species placed in *Atopopompilus* by Banks (1947) are here regarded as members of *Paracyphononyx*, following Evans (1966).

After study of reasonable series of specimens and their geographical distribution, and an antero-postero gynandromorph individual, the association of sexes originally made by Haupt can now be confirmed unreservedly. The carinate-faced males are here recognized as the true males of *Atopopompilus*. It is the purpose of this paper to revise the species of this Palaeotropical genus, here recalled from the synonymy of *Paracyphononyx*. The identity of *Anoplinellus* is examined, and the name disposed of as a synonym of the genus to which its type-species belongs.

I continue to follow the terminology of Evans (1966); abbreviations here employed are as follows:

- LID: lower interocular distance (distance between eyes below antennae)
- MID: middle interocular distance (distance between eyes across front)
- SMC: submarginal cell
- TFD: transfacial distance (width of head)
- UID: upper interocular distance (distance between eyes on vertex).

Depositories in which material studied is housed are as follows; abbreviations for these institutions used in the text are also here listed.

AM	Albany Museum, Grahamstown, Cape Province, Republic of South Africa.
BMNH	British Museum (Natural History), London.
IRSNB	Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium.
ISM	Institut Scientifique, Madagascar.
MB	Museu Bocage, Lisbon, Portugal.
MCZ	Museum of Comparative Zoology, Boston, U.S.A.
MHN	Muséum d'Histoire Naturelle, Geneva, Switzerland.
MNHN	Muséum National d'Histoire Naturelle, Paris, France.
MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin, East Germany.
MRAC	Musée Royal de l'Afrique Centrale, Tervuren, Belgium.
NM	Naturhistorisches Museum, Basle, Switzerland.
NMR	National Museum of Rhodesia, Bulawayo, Rhodesia.
NR	Naturhistoriska Riksmuseum, Stockholm, Sweden.
TM	Transvaal Museum, Pretoria, Transvaal, Republic of South Africa.
UM	University Museum, Oxford, United Kingdom.
USNM	United States National Museum, Washington, U.S.A.
ZM	Phyletisches Museum, Halle an der Saale, East Germany.
coll. Wahis	Private collection of Monsieur R. Wahis, Chaudfontaine, Belgium.

## ACKNOWLEDGEMENTS

I am indebted to the following staff of other institutions who have arranged loans of type or other material: Dr C. Baroni Urbani (NM), Dr C. Besuchet (MHN), Dr J. Decelle (MRAC), Prof. H. E. Evans (MCZ), Dr G. Fagel (IRSNB), Dr J. de A. Fernandes (MB), Mr F. W. Gess (AM), Prof. J. O. Husing (ZM), Dr S. Kelner-Pillault (MNHN), Dr E. Königsmann (MNHU), Dr A. S. Menke (USNM), Mr F. C. de Moor (NMR), Mr C. O'Toole (UM), Dr P. I. Persson (NR), Mr J. van Reenan (TM). I am indebted to: Monsieur R. Wahis, both for helpful correspondence and for the loan of specimens; Prof. H. E. Evans has discussed the identity of *P. clotho* with me.

THE IDENTITY OF *ANOPLINELLUS* BANKS, AND ITS TYPE-SPECIES

Banks (1934) proposed *Anoplinellus* for females of a species of Pompilidae from the Philippines and Indonesia which he misidentified as *Pompilus clotho* Smith, 1879, which species is type by monotypy. Female specimens bearing Banks's labels have been examined, and are here identified as conspecific with *Pompilus daedalus* Bingham, 1896, a species here regarded as congeneric with *Pompilus venans* Kohl, 1894, type-species of *Atopopompilus* Arnold. The material consists of the following specimens: a female from Iligan, Mindanao (coll. Baker) in the USNM, bearing a label 'Anoplinellus clotho Sm.'; a female in MCZ from Sandakan, Borneo (coll. Baker) bearing a label 'Anoplius clotho Sm.'; and two females from Celebes (Sulawesi) (coll. C. F. Clagg). One of the Celebes females bears a Banks manuscript name in *Anoplinellus*; he referred to this undescribed material in 1934.

*P. clotho* Smith was described from a single female specimen. This holotype is in the BMNH, and agrees well with the description; it is a species of *Anoplius* Dufour. It bears a label in Smith's hand, 'Pompilus clotho type Sm.', and a second small white circular label has written on one side the figures '54. 76', and 'Sumatra' on the

reverse. The figures refer to an entry in the accessions register of BMNH dated 1854. The data recorded indicate that the specimen came to the museum as part of a collection disposed of by the Zoological Society of London through the London dealer, Stevens. This collection included material gathered from several sources; some from Sumatra, collected for Sir Stamford Raffles, and some from 'San Domingo' collected by Hearne; also material from Brazil, Colombia, 'Niger', Trebizond and Madagascar. The holotype of *P. clotho* is labelled as part of the material collected in Sumatra. However, I know of no other Oriental or Indonesian specimens similar to the holotype. The specimen, which has lost parts of some legs and an antenna, and has its pubescence much rubbed, nevertheless is immediately noteworthy in that it presents the characteristic facies of many Nearctic species of Pompilidae.

The type of *P. clotho* is in my opinion consubgeneric with the type-species of *Arachnophroctonus* Howard, a subgenus of *Anoplus*. The species of *Arachnophroctonus* known to me from the East Indies are markedly different in coloration, and readily separated morphologically, from *P. clotho*. In Evans's (1951; 1966) keys to species of North and Central American *Arachnophroctonus*, the specimen keys out as *A. relativus* Fox, 1893, recorded by Evans as a 'somewhat variable species'. The holotype of *P. clotho* (bearing in mind its poor condition) is closely similar to specimens of *A. relativus*.

Since other material in the collection obtained by the BMNH from Stevens came from San Domingo rather than Sumatra, there is a reasonable possibility that this type-specimen could have been collected in the West Indies or Central America. San Domingo is normally construed as referring to the present-day Dominican Republic. It is conceivable but unlikely that some other locality of this name on the Central American mainland was intended. H. E. Evans (personal communication) informs me that *A. relativus* is not yet known to occur in the West Indies. However, he has seen males of a closely related undescribed species from the Dominican Republic.

It would seem likely that the holotype could have been mislabelled 'Sumatra' when incorporated into the BMNH collections; certainly, the type-locality should be regarded as doubtful. However, three possibilities should be considered:

- (a) *P. clotho* may be an Indonesian species of *Anoplus*, known only from the type-specimen;
- (b) *P. clotho* may be a West Indian species of *Anoplus*;
- (c) *P. clotho* may be a senior synonym of *A. relativus*.

On the balance of present evidence, the second possibility seems most probable. It is not feasible here completely to resolve the problem since our knowledge of the pompilid faunas of East and West Indies is so imperfect.

Haupt (1935) described *Anoplinellus javanus* from two female specimens collected in Java. He recognized the genus *Anoplinellus* as described by Banks, and stated 'male unknown'. No authors have subsequently used the name *Anoplinellus*, save in a catalogue of the genera of Pompilidae (Pate, 1946).

Although proposed at a later date than *Anoplinellus*, *Atopopompilus* has enjoyed more frequent use (Arnold, 1937; 1951; Haupt, 1950; de Saeger, 1945) and has had

more nominal species referred to it. The type-species has always been correctly identified. In view of the more limited use of *Anoplinellus*, the misidentification of its type-species, and the doubt surrounding the provenance of the type-specimen of *P. clotho*, I propose to place *Anoplinellus* in the synonymy of *Arachnophroctonus*, with the type-species of which *P. clotho* is consubgeneric. The nomenclatural changes are formalized below.

#### Subgenus *Arachnophroctonus* Howard

*Arachnophroctonus* Howard, 1901: pl. 7, fig. 11. Type-species: *Sphex tropicus* Linnaeus sensu Fabricius, 1775 (misidentification) [= *Psammochares marginalis* Banks, 1910], by subsequent designation (Pate, 1946: 129).

*Anoplinellus* Banks, 1934: 84. Type-species: *Pompilus clotho* Smith, 1879, by monotypy.  
**Syn. n.**

*Anoplius* (*Arachnophroctonus*) *clotho* (Smith) **comb. n.**

*Pompilus clotho* Smith, 1879: 146. Holotype ♀, provenance uncertain: labelled 'Sumatra', but more probably DOMINICAN REPUBLIC (BMNH) [examined].

*Atopopompilus* Arnold is thus the only available name for the genus here revised.

#### Genus *ATOPOPOMPILUS* Arnold **stat. rev.**

[*Anoplinellus* Banks, 1934: 84. Misidentification, see above]

*Atopopompilus* Arnold, 1937: 22. Type-species: *Pompilus venans* Kohl, 1894 [= *Pompilus carinatus* Radoszkowski, 1881], by original designation.

♀♂. Length 7–23 mm. Body colour black; females of some species with more or less red-brown coloration on head, thorax or legs, more rarely light red-brown; antennae sometimes red-brown to orange; palpi frequently light red-brown. Males as above, but frequently with a yellow line on posterior pronotal margin, often extensively yellow on face, dorsal surface of hind tibia, and often on tarsi and seventh tergite. Female wings infusate, darker at margin; male, hyaline with infusate margin or fusco-hyaline with darker margin. Both sexes with more or less grey or white pubescence on face, thorax, coxae and abdomen. Female with sparse, long, thin erect hairs on head, thorax, coxae and abdomen, each arising from a more or less distinct small pit; less noticeable on dorsum of thorax and abdomen. Male often less hirsute, but hairs frequently white, more noticeable. Female post-scutellum and propodaeum often with numerous short thick, dark erect hairs also, which may appear thickened or adpressed, and sometimes reflect violaceous. Male post-scutellum and posterior half or third of propodaeum with very dense, long, erect white pubescence, perpendicular to insertion or at an angle. Posterior tergite and sternites of female with more or less marked strong erect hairs.

Head thin in lateral view (Text-figs 1, 3), inserted low on thorax; vertex abrupt, not gently rounded; labrum exposed, semicircular or truncate; mandibles short, normally not exceeding opposite edge of labrum when closed, with a single tooth on inner margin. Malar space present, not exceeding half thickness of first flagellar segment. Female face with a small interantennal tubercle, sometimes with a faint trace of a carinate edge continuing just below the antennal insertions. Male face with a more or less strong facial carina, from middle of face passing between antennal insertions, normally to reach clypeus, where it may divide in two and become lost (Text-figs 29–34). Female antennae normally elongate, thin, but rarely with shorter, thicker antennae. Male antennae strongly crenulate. Occiput concave transversely, vertex well defined, never carinate. Temples almost obsolete. Thorax relatively massive, pronotum narrowed in front, short, with more or less arcuate posterior margin. Postnotum short, very

slightly expanded on either side of the median line. Female propodaeum frequently with more or less well defined sloping posterior declivity, sometimes flattened also on lateral corners; rarely, propodaeum rounded. Declivity occasionally concave, sometimes with very fine aciculae centrally; one species with distinct tubercles produced laterally. Male propodaeum usually with low lateral profile, rounded. Legs elongate, strongly spinose, but female without tarsal comb; foremetatarsus with two short lateral spines in addition to terminal spine. Ultimate tarsal segments lack spines beneath, claws strongly bifid, with a broad, truncate rear tooth. Apical segment of male foretarsus unmodified with claws asymmetric, inner claw more curved, tooth stout and blunt. Female abdomen somewhat compressed apically, last sternite strongly so with well-marked blunt, polished ventral carina at least terminally. Forewings with SMC<sub>2</sub> approximately equal to SMC<sub>3</sub>, latter often narrowed above. Radial vein beyond SMC's with characteristic curve (Text-fig. 9). Male genitalia with basal hooklets single. Parameres only just exceeding other appendages, very thin, with more or less long hairs. Subgenital plate with more or less triangular termination, sometimes truncate at tip, hairy but without thick spines or long hairs on posterior margin (Text-fig. 23).

Females may readily be recognized by the combination of bifid claws, malar space, and the compressed posterior abdominal segments with a short ventral carina terminally. The general habitus, especially the high, broad thorax and thin head, render the genus particularly recognizable. The males, with the conspicuous facial carina and crenulate antennae, can be confused only with *Batozonellus* Arnold or *Paracyphononyx* in the Old World. The former may be recognized by the characteristic venation, broad face, and arcuate expansion of the postnotum either side of the midline. Males of the latter genus lack the carinate face.

**DISTRIBUTION.** Forest, woodland and savanna areas of the Old World tropics including Ethiopian and Malagasy, Oriental and Indonesian regions.

**BIOLOGY.** Unknown. Morphology indicates a non-fossorial habit. This genus may utilize pre-existing nest-cavities, or leave prey in situ at site of attack.

**INCLUDED SPECIES.** Five Ethiopian, one Malagasy, and one Oriental species are here regarded as members of *Atopopompilus*. The Ethiopian species form a more closeknit group, the two remaining species being each somewhat distinctive; however, I do not feel that any infrageneric grouping is necessary.

Although *Atopopompilus* has much in common with *Paracyphononyx*, it is a very distinctive and comparatively homogeneous group of species. It is not possible at this stage to state with any certainty whether the similarities of the two genera are due to convergence or to close relationship. It seems most convenient, in the absence of biological information, to regard *Atopopompilus* as a genus perhaps standing in a similar relationship to *Paracyphononyx* as does *Batozonellus* to *Episyrton* Schiödte. Its status may better be reassessed when the more diverse and widespread *Paracyphononyx* has been adequately revised.

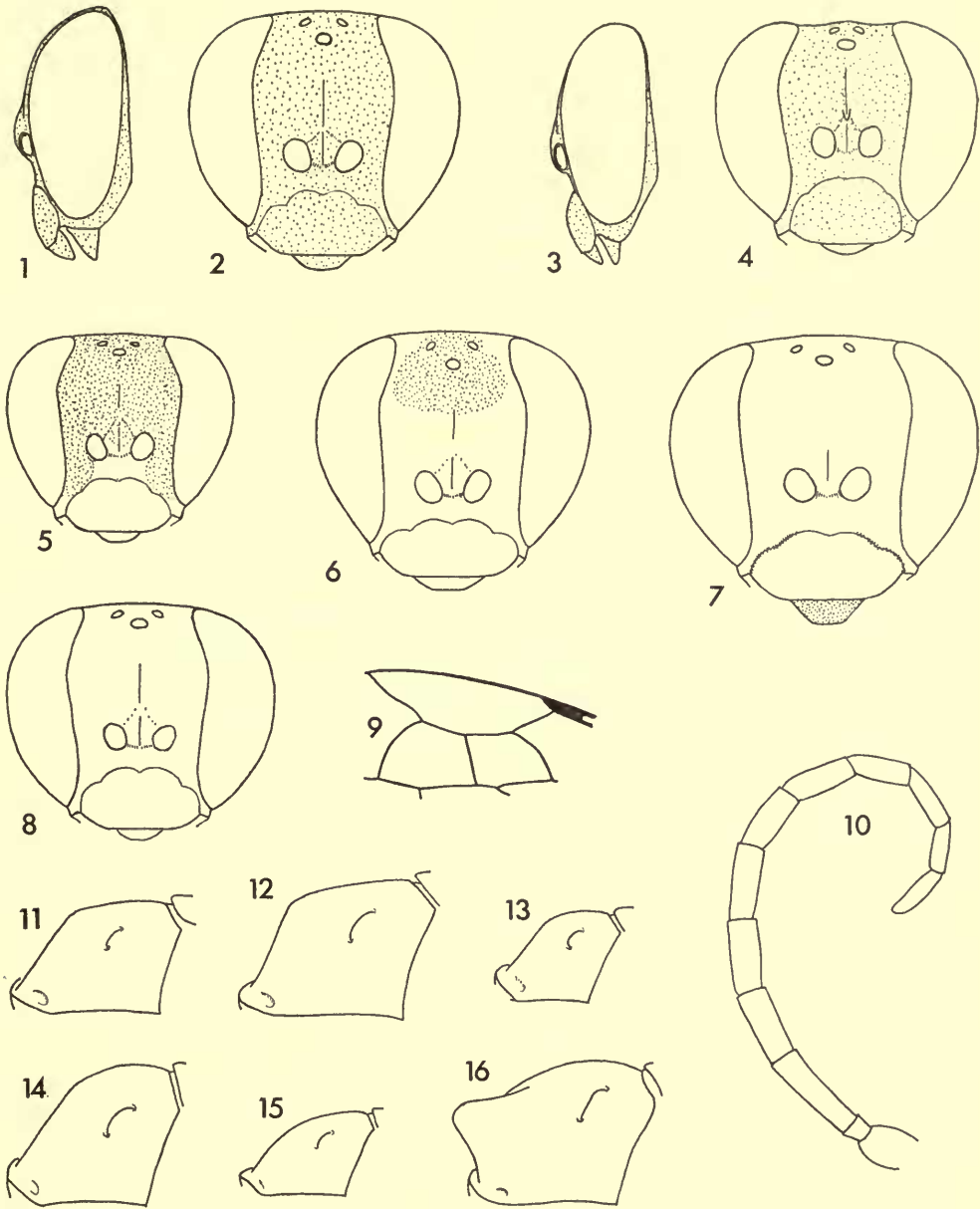
## KEY TO THE SPECIES OF *ATOPOPOMPILUS*

### FEMALES

- 1 Propodaeum with well-developed lateral tubercles (Text-fig. 16). Black, with more or less red-brown anteriorly, on head and thorax. Madagascar.

*nefas* (Dalla Torre) (p. 63)





FIGS 1-16. 1-8. Female head: 1. *A. carinatus*, side view. 2. Facial view. 3. *A. daedalus*, side view. 4. Facial view. 5-8. Facial views. 5. *A. nasutus*. 6. *A. kilimandjaroensis*. 7. *A. nefas*. 8. *A. jacens*. 9. Submarginal cells of forewing, *A. carinatus*, female. 10. Female antenna, *A. crassicornis*. 11-16: Female propodeum, lateral profile. 11. *A. carinatus*. 12. *A. kilimandjaroensis*. 13. *A. jacens*. 14. *A. daedalus*. 15. *A. nasutus*. 16. *A. nefas*.

- Propodaeum without lateral tubercles. If with red-brown head and prothorax, then antennae also so coloured . . . . . 2
- 2 Head short, broad, flat in the face (Text-figs 3, 4). Oriental region  
*daedalus* (Bingham) (p. 66)
- Head less short, face more convex (Text-figs 1, 2, 5, 6, 8). Ethiopian region . . . . . 3
- 3 Unicolorous black, or black with very dark brown appendages; often with a little red-brown ventrally on antennae . . . . . 4
- Black with antennae substantially red-brown or orange, sometimes legs and/or head and prothorax red-brown . . . . . 5
- 4 Second and subsequent few flagellar segments at least  $4.0 \times$  as long as wide.  
*carinatus* (Radoszkowski) (p. 54)
- Second and subsequent few flagellar segments not more than  $3.0 \times$  as long as wide (Text-fig. 10) . . . . . *crassicornis* sp. n. (p. 57)
- 5 Prothorax red-brown or yellow-brown . . . . . *jacens* (Bingham) (p. 61)
- Prothorax black . . . . . 6
- 6 Antennae orange, sometimes darker basally; face almost maroon, area about ocelli black (Text-fig. 6). Propodaeum massive, with marked declivity (Text-fig. 12)  
*kilimandjaroensis* (Cameron) (p. 59)
- Antennae and legs, clypeus and lower part of face red- or orange-brown (Text-fig. 5). Propodaeum rounded (Text-fig. 5) . . . . . *nasutus* (Haupt) (p. 58)

#### MALES

- 1 Propodaeum excised behind; wings lightly infusate, head and anterior part of thorax red-brown, otherwise black. Madagascar . . . . . *nefas* (Dalla Torre) (p. 63)
- Propodaeum not excised behind: wings fusco-hyaline, or hyaline with infusate outer margins. Body black, with some yellow colour; if with red-brown on thorax, then legs or antennae so coloured. Oriental and Ethiopian regions . . . . . 2
- 2 Wings fuscohyaline with tips infusate, body colour black with some yellow on face, prothorax, hind tibiae and seventh tergite . . . . . 3
- Wings fuscohyaline, or hyaline with infusate tips. Body colour black and yellow, also with some red-brown at least on appendages, often also on head and thorax . . . . . 5
- 3 Facial carina not distinct on clypeus (Text-figs 29, 30). Oriental region. Antennae as in Text-fig. 24. . . . . *daedalus* (Bingham) (p. 66)
- Facial carina distinct on clypeus, forked to give two lateral arms (Text-figs 31-33). Ethiopian region . . . . . 4
- 4 Antennal crenulations angulate ventrally in profile (Text-fig. 25)  
*carinatus* (Radoszkowski) (p. 54)
- Antennal crenulations curved ventrally in profile (Text-fig. 27) *crassicornis* sp. n. (p. 57)
- 5 Antennal crenulations angulate ventrally (Text-figs 25, 28) . . . . . 6
- Antennal crenulations curved ventrally (Text-fig. 27)  
*kilimandjaroensis* (Cameron) (p. 59)
- 6 Forewing hyaline with infusate tip; antennae shorter, stouter, with less curvature dorsally on each segment (Text-fig. 28) . . . . . *jacens* (Bingham) (p. 61)
- Forewing fuscohyaline with infusate tip; antennae more elongate, with more distinct segmental curvature dorsally (Text-fig. 25) . . . . . *nasutus* (Haupt) (p. 58)

#### *Atopopompilus carinatus* (Radoszkowski) comb. n.

(Text-figs I, 2, 9, II, I7, 23, 25, 3I, 32)

*Pompilus carinatus* Radoszkowski, 1881 : 212. Holotype ♂, ANGOLA (MB, Lisbon) [examined].

*Pompilus venans* Kohl, 1894 : 315. Holotype ♀, SIERRA LEONE (TM, Pretoria) [examined].

**Syn. n.**

*Paracyphononyx venans* (Kohl) Haupt, 1929 : 168; ♀, ♂.

*Paracyphononyx affinis* Haupt, 1929 : 170. Holotype ♂, CAMEROUN (MNHU, Berlin) [examined]. **Syn. n.**

*Paracyphononyx affinis* Haupt; Arnold, 1936 : 445; ♂.

*Atopopompilus venans* (Kohl) Arnold, 1937 : 23; ♀.

*Atopopompilus venans* (Kohl); Haupt, 1950 : 57; ♀, ♂.

♀. Length 13–21 mm. Black; legs and antennae sometimes very dark brown; sensory areas of antennae often red-brown. Face below antennae with some silvery pubescence, otherwise pubescence more commonly brownish. Hairs of head and thorax relatively long (often as long as thickness of scape), dense, often lost in worn specimens.

Antennae most usually elongate, but occasionally less so (second flagellar segment only 4 × as long as thick). Front narrow, high (Text-fig. 2), proportions variable. Inner orbits converge strongly above, converging or sub-parallel below. Thorax of form described for genus, propodeum with a pronounced declivity which frequently has a central area of very fine aciculae; with long erect hairs and adpressed short hairs. SMC<sub>3</sub> narrowed above, shorter on radial vein than is SMC<sub>2</sub>.

♂. Length 7–15 mm. Black; border of inner orbits, tip of facial carina, lateral area of clypeus, posterior pronotal margin, area on dorsal surface of hind tibia, yellow. At least some reddish ventrally on basal antennal segments, some populations with much of antennae, labrum, tip of clypeus, and part of legs dark or light red-brown. Wings fusco-hyaline with darker margins. Body extensively silvery pubescent, with much erect silvery hair, particularly on posterior third of propodeum, less on anterior half of first tergite. Seventh tergite with a small amount of whitish yellow colour in dark specimens, more extensively so in specimens with some red-brown coloration.

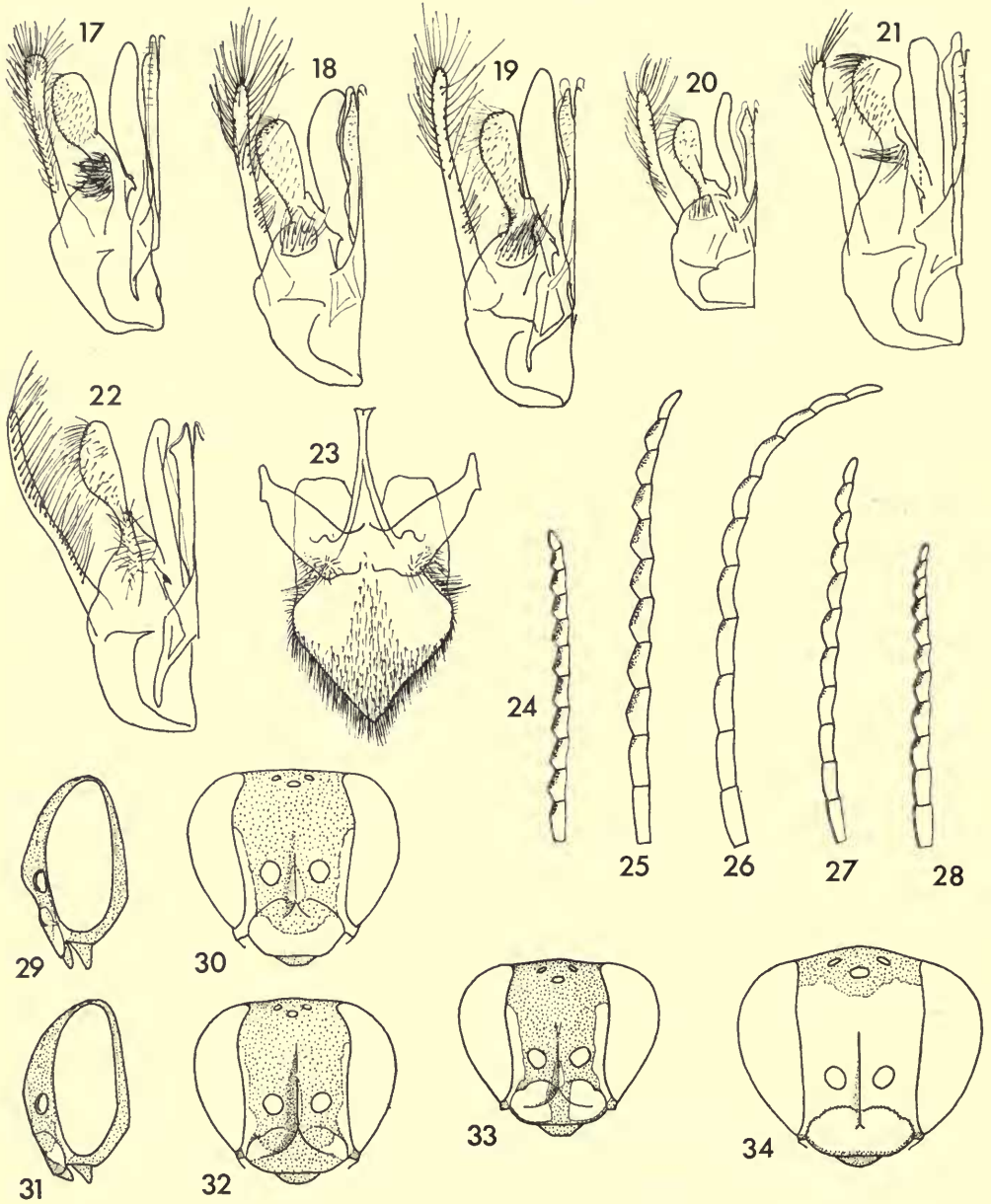
Antennae (Text-fig. 25) markedly crenulate, each segment with a sharp ventral angle when viewed in profile. Face with well marked carina extending onto clypeus. Inner orbit of eyes converging above, sub-parallel, then diverging below (Text-fig. 32). Genitalia as in Text-fig. 17.

The holotype of *P. carinatus* stands under that name in the collections of MB, Lisbon. It is in fair condition but bears no original labels. Radoszkowski's description, though brief, is unmistakable and applies well to the type-specimen. However, Arnold applied the name to *A. jacens* (p. 61), despite the fact that the description of *P. carinatus* does not mention any red coloration.

Haupt associated a male from Bonjongo with *P. venans*. This specimen, in the collections of MNHU, Berlin, bears Haupt's determination label and a 'type' label (i.e. so-called 'allotype' of *P. venans* Kohl). It has no such status. It is clearly conspecific with the type of *P. affinis*, though the yellow coloration of the former specimen is much reduced. It was on a basis of this colour difference that Haupt separated the two in couplet 12 of his key to males (1929). The confusion amongst the African species arises mainly from this inadequate key, and from Arnold's consequent misidentifications.

**DISTRIBUTION.** The species is characteristic of the dense humid forest regions of Central and West Africa; summarized on Map 1, p. 60.

**VARIATION.** The antennae of females show much variation in length relative to thickness. This correlates broadly with the relative proportions of the thorax and legs, in that females with shorter, thicker antennae tend to have shorter, thicker legs and a more massive thorax. The face of a female with attenuate antennae is



FIGS 17-34. 17-22. Male genitalia, left half, ventral view. 17. *A. carinatus*. 18. *A. nasutus*. 19. *A. kilimandjaroensis*. 20. *A. jacens*. 21. *A. nefas*. 22. *A. daedalus*. 23. Subgenital plate, *A. carinatus*, male. 24-28. Male antennal flagellum, i.e. excluding scape and pedicel. 24. *A. daedalus*. 25. *A. carinatus*. 26. *A. nefas*. 27. *A. kilimandjaroensis*. 28. *A. jacens*. 29-34. Male head. 29. *A. daedalus*, side view. 30. Facial view. 31. *A. carinatus*, side view. 32. Facial view. 33-34. Facial views. 33. *A. crassicornis*. 34. *A. nefas*.

illustrated in Text-fig. 2; females of the more compact structure tend to have a slightly broader face; it is difficult to segregate these females from those of *A. crassicornis* sp. n. (see below). Males in West Africa have a tendency towards the development of red-brown coloration on antennae and legs.

#### MATERIAL EXAMINED.

*Pompilus carinatus* Radoszkowski, holotype ♂, ANGOLA: no further data (Welwitsch) (MB, Lisbon). *Pompilus venans* Kohl, holotype ♀, SIERRA LEONE: 25.viii.1892 (H. Brauns) (TM, Pretoria). *Paracyphononyx affinis* Haupt, holotype ♂, CAMEROUN: 'Joh. Albrechtshohe' (Conradt) (MNHU, Berlin).

ANGOLA: Salazar, field station of I.I.A.A., on path through dense humid forest, 9-15.iii.1972, 2 ♀ (*D. Hollis*); same, in Malaise trap, 1 ♂; 7 miles west of Gabela, in coffee plantation, swept from vegetation beside path, 17.iii.1972, 1 ♂ (*M. C. Day*) (BMNH Southern African Expedition, 1972) (BMNH). CAMEROUN: Lolodorf, 2 ♀ (Conradt); Bonjongo, 17.iv.1873, 1 ♂ (so-called 'allotype' of *P. venans*); Victoria, on flowers of *Bidens pilosus*, 5.vii.1890, 1 ♀ (*Preuss*) (MNHU); R. Dja, 3°15' N., 13°30' E., v-vii.1936, 1 ♀ (*F. G. Merfield*) (BMNH). DAHOMEY: no further data, 1903, 1 ♀ (*E. Poisson*) (MNHN). GABON: Mts de Cristal, 15-31.x.1969, 1 ♀ (*A. Villiers*) (MNHN). GHANA: Ashanti, Obuasi, 1908, 1 ♀ (*W. M. Graham*); Aburi, 1400', xii. 1941, 1 ♂ (*K. M. Guichard*) (BMNH). NIGERIA: Olokemeji, near Ibadan, 1 ♂ (*Bridwell*) (USNM); Ibadan, 4.vii.1922, 1 ♂ (*A. W. J. Pomeroy*) (BMNH). SIERRA LEONE: Njala, x. 1935, 1 ♀ (*E. Hargreaves*) (BMNH). TOGO: Bismarck Mts, 1890, 1 ♀ (*Buttner*) (MNHU). UGANDA: Mabira Forest, Chagwe, 3500'-3800', 16-25.vii.1911, 1 ♀; W. shores of Lake Victoria, Buddu, 3700', 19-25.ix.1911, 1 ♀; Entebbe, 1-11.xi.1911, 2 ♀ (*S. A. Neave*); Mabira Forest, 3.vii.1913, 1 ♀ (*C. C. Gowdey*) (BMNH). RWANDA: Bukavu (Costermansville), 1939, 1 ♀, 1 ♂ (*Hautmann*); 1948, 1 ♂ (*P. H. Vercammen*); Muhavura, 2100 m, 28.i.1953, 1 ♂ (*P. Basilewsky*) (MRAC). ZAIRE: Kibali-Ituri, Epulu, x. 1956, 1 ♀ (*M. Poll*); Kivu, Kavumu, 1951, 1 ♀ (*H. Bomans*); Paulis, viii. 1947, 1 ♀ (*P. L. G. Benoit*); Bambesa, 20.ix.1933, 1 ♀ (*H. J. Bredo*); 20.x.1933, 1 ♀ (*J. Leroy*); viii-xii. 1937, 4 ♀ (*J. Vrydagh*); v. 1938, 3 ♀ (*P. Henrard*) (MRAC); Bambesa, 11.ix.1937, 1 ♀ (*J. Vrydagh*) (IRSNB); Bambesa, 25.ix.1933, 1 ♀ (*H. J. Bredo*); Ubangi, Duma, 10.x.1910, 1 ♀ (*H. Schubotz*) (MNHU); Bumba, 1940, 1 ♀ (*H. de Saeger*) (MRAC); Coquilatville, 10.vii.1936, 1 ♀ (*R. P. Hulstaert*) (MNHN); Eala, xi. 1935, 1 ♂ (*J. Ghesquière*); Tshuapa, Bamanya, xi. 1964, 1 ♀ (*R. P. Hulstaert*); Sankuru, Komi, ii. 1930, 1 ♂ (*J. Ghesquière*) (MRAC); Lualaba River, 5.v.1907, 1 ♀ (*S. A. Neave*) (BMNH); Luluabourg, 1 ♀ (MHN); Kasai, Kondue, 1 ♀ (*E. Luja*); Kasongo, ix. 1959, 1 ♀ (*P. L. G. Benoit*); Mutsors?, 1939, 1 ♀ (*Hackars*) (MRAC).

#### *Atopopompilus crassicornis* sp. n.

(Text-figs 10, 27, 33)

♀. Length 11-14 mm. Black; morphologically very close to *A. carinatus*, but of more compact structure. Face wider, thorax stouter, less hirsute, legs and antennae shorter, thicker

(antenna as in Text-fig. 10). Antennal segments tend towards oval section, second flagellar segment not more than  $3 \times$  as long as greatest width.

♂. Length 11 mm. Black with yellow maculation on face and prothorax; morphologically close to *A. carinatus*. Head broad, less high than in *A. carinatus* (Text-fig. 33). Antennal segments curved beneath in profile, ventral sensory areas as those of *A. kilimandjaroensis* (Text-fig. 27). However, dimensions of segments more nearly those of *A. carinatus* (Text-fig. 25).

Two females of this species from Uganda were collected together with typical females of *A. carinatus*, and as a matter of direct comparison are clearly distinct both in the more compact form of the thorax, and the short, thick antennae. However, females from other parts of the range of *A. carinatus* tend to bridge the gap between the extremes represented by these Ugandan females. On the basis of female structure alone, I would hesitate to describe this taxon. However, certain characters that I believe are those of the male are exhibited by a gynandromorph specimen, of which all save the abdomen is male. I am confident that the structure of the antennae and head are typical of the species it represents, and not modified as a result of its mosaic genotype. The shape of the head, together with the curved antennal crenulations and general coloration separate this specimen from all other males I have seen. In particular, I have found antennal structure to give reliable identification of males in this genus, and the nature of the antennal differences observed in this specimen relative to the male of *A. carinatus* is entirely consistent with the sorts of differences observed between other species. Geographical distribution further supports the association of this gynandromorph with the females here described.

DISTRIBUTION. East Africa; highland and lake area of the Great Rift Valley in Uganda and Eastern Zaire: summarized on Map 1, p. 60.

#### MATERIAL EXAMINED.

Holotype ♀, UGANDA: Entebbe, 1-11.ix.1911 (*S. A. Neave*) (BMNH).

Paratypes. UGANDA: west shores of Lake Victoria, Buddu, 3700', 19-25.ix.1911, 1 ♀ (*S. A. Neave*) (BMNH). ZAIRE: Mt Hoyo, Ituri, 1250 m, 5.x.1957, gynandromorph (*E. S. Ross & R. E. Leach*) (coll. Wahis); Kibali-Ituri, Kilo, Mongbwalu, 1937, 1 ♀ (*Harford-Jordens*); Kilo, Mines, 1955, 1 ♀ (*R. Andry*) (MRAC).

### *Atopopompilus nasutus* (Haupt) comb. n.

(Text-figs 5, 15, 18, 25)

*Paracyphononyx nasutus* Haupt, 1929: 170. Holotype ♂, TANZANIA (MNHU, Berlin) [examined].

[*Atopopompilus venans* (Kohl) sensu Arnold, 1937: 24. ♀ colour variety. Misidentification.]  
*Atopopompilus bruneiipes* Haupt, 1950: 57. Holotype ♀, ZAIRE (MRAC, Tervuren) [examined].

#### Syn. n.

♀. Length 12-17 mm. Black; face below antennal insertions, clypeus, labrum, mandibles, antennae, tibiae and tarsi orange-brown; sometimes also part or all of femora. Face below and beside antennae with silvery pubescence, otherwise pubescence mostly brownish. Hairs of head relatively long and dense as in *A. carinatus*.

Antennae elongate. Inner orbits converging above, less strongly so below. SMC<sub>3</sub> narrowed above, half as long on radial vein as is SMC<sub>2</sub>. Propodaeum sloping gently (Text-fig. 15), rounded in profile, with incipient adpressed hairs or very short fine erect hairs projecting backwards, not vertical. Face as in Text-fig. 5.

♂. Length 8–12 mm. Black; clypeus, ventral surface of proximal antennal segments, tibiae and tarsi red-brown; femora sometimes also so. Border of inner orbits, part of clypeus, posterior pronotal margin, and dorsal surface of hind tibia, yellow. Seventh tergite whitish yellow. Wings fusco-hyaline with darker margins. Otherwise morphologically very close to *A. carinatus*. Genitalia as in Text-fig. 18.

Arnold placed *P. nasutus* in the synonymy of *P. carinatus*, by which name he misidentified *A. jacens*.

I have seen only two males, only one of which has part of its antennae. The proximal six segments are similar in form to those of *A. carinatus* (Text-fig. 25).

DISTRIBUTION. East Africa; summarized on Map 1, p. 60.

#### MATERIAL EXAMINED.

*Paracyphononyx nasutus* Haupt, holotype ♂, TANZANIA: Usambara, Nguela, (*Rolle*) (MNHU, Berlin). *Atopopompilus bruneipes* Haupt, holotype ♀, ZAIRE: Parc National Albert, Rutshuru, 10–24.vi.1934 (*G. F. de Witte*) (MRAC, Tervuren).

UGANDA: Entebbe, viii.1911, 3 ♀ (*C. C. Gowdey*); Entebbe, i–ii.ix.1911, 1 ♀ (*S. A. Neave*); Kampala, 19–28.xii.1915, 1 ♀ (*C. C. Gowdey*); Tero Forest, S.E. of Buddu, 3800', 26–30.ix.1911, 1 ♀ (*S. A. Neave*); Mubendi, 4.v.1911, 1 ♀ (*C. C. Gowdey*); 1918, no further data, 1 ♀ (*C. C. Gowdey*) (BMNH). ZAIRE: Rutshuru, xi. 1937, 1 ♂ (*J. Ghesquière*) (MRAC).

### *Atopopompilus kilimandjaroensis* (Cameron) comb. n.

(Text-figs 6, 12, 19, 27)

*Pompilus kilimandjaroensis* Cameron, 1910 : 252. Holotype ♀, TANZANIA (NR, Stockholm) [examined].

*Paracyphononyx personatus* Haupt, 1929 : 170. Holotype ♂, TANZANIA (MNHU, Berlin) [examined]. **Syn. n.**

[*Paracyphononyx parallelus* Haupt sensu Arnold, 1936 : 445; ♀. Misidentification.]

*Atopopompilus venans* race *mlanjiensis* Arnold, 1937 : 24. Holotype ♀, MALAWI (BMNH) [examined]. **Syn. n.**

♀. Length 14–23 mm. Black; antennae, often including scapes, yellow-orange to orange-brown. Head capsule dark red-brown, almost maroon; with varying amounts of black on face, normally at least a horizontal band through anterior ocellus, sometimes reaching down to antennal insertions and back to vertex. Pubescence mostly brownish. Erect hairs of head and thorax shorter than in *A. carinatus* (mesopleural hairs shorter than thickness of second flagellar segment).

Antennal segments long, more than 4 × as long as wide. Inner orbits converging above, less strongly so below (Text-fig. 6). SMC<sub>3</sub> narrowed above, usually shorter on radial vein than is SMC<sub>2</sub>. Propodaeum (Text-fig. 12) with abrupt and steep declivity, and posterior corners also flattened at 45 degrees. Erect hairs long (almost thickness of scape), adpressed hair dense and extensive.

♂. Length 9–12 mm. Black; mouthparts and clypeus, antennae and legs substantially red-brown; part of clypeus, facial carina, borders of inner orbits, temples, posterior pronotal

margin, spots on forelegs and dorsal surface of hind tibia, yellow. Last tergite white. Wings hyaline with infuscate margins. Body hair extensive, silvery, pubescence silver or grey. Propodaeum, save spiracular area, with extensive, dense silvery erect hair.

Morphologically very similar to *A. carinatus*, but antennal segments in lateral view rounded beneath (Text-fig. 27). Genitalia as in Text-fig. 19.

Arnold placed *P. personatus* in the synonymy of his *P. carinatus* (*A. jacens*). He also misidentified a female as *P. parallelus*, whilst excluding *P. venans* from *Paracyphononyx*.



MAP I. Distribution of *Atopopompilus* species in the Ethiopian and Malagasy regions.



**DISTRIBUTION.** Through much of the woodland and savanna areas of Africa; summarized on Map 1, p. 60.

**VARIATION.** Two females, from Bambesa and Moto, have a colour pattern very similar to that of *A. nasutus* females. The form of the propodaeum, however, is that of *A. kilimandjaroensis*. The colour pattern of the face of West African populations is more extensively dark, closely similar to that of *A. nasutus*.

I have seen only three males of this species.

#### MATERIAL EXAMINED.

*Pompilus kilimandjaroensis* Cameron, holotype ♀, TANZANIA: Kilimandjaro, Kibonoto, 1300–1900 m, 11.v.1906 (*Sjostedt*) (NR, Stockholm). *Paracyphononyx personatus* Haupt, holotype ♂, TANZANIA: Langenberg, v. 1898 (*Fulleborn*) (MNHU, Berlin). *Atopopompilus venans mlanjiensis* Arnold, holotype ♀, MALAWI: Mlange, 6.i.1913 (*S. A. Neave*) (BMNH).

ANGOLA: no further data, 1 ♂ (*Welwitsch*) (BMNH). GHANA: Accra, 13.vii.1941, 1 ♀ (*K. M. Guichard*); Tafo, 28.x.1970, 1 ♀ (*B. Bolton*) (BMNH). IVORY COAST: Assinie, 1886, 1 ♀ (*C. Alluaud*) (coll. Wahis). KENYA: Kwali Forest, 20 miles west of Mombasa, 1.iv.1948, 1 ♀ (*M. Steele*) (BMNH). MALAWI: Mt Mlange, xi. 1912–xi. 1913, 2 ♀, 1 ♂; near mouth of Lusangazi river, 1–3.ix.1910, 1 ♀; valley of N. Rukuru, Karonga district, 2000–4000', 15–18.vii. 1910, 1 ♀ (*S. A. Neave*) (BMNH); Mlanje, 2000', 20.i.1945, 1 ♀ (NMR). MOZAMBIQUE: foothills N. of Mt Chipirone, 19.xi.1913, 2 ♀; Kola valley E. of Mt Chipirone, 21.xi.1913, 2 ♀ (*S. A. Neave*) (BMNH). SIERRA LEONE: no further data, 1 ♀ (BMNH). TANZANIA: Langenberg, 20.viii–1.ix.1898, 1 ♀ (*Fulleborn*) (MNHU). ZAIRE: Moto, 1922, 1 ♀ (*L. Burgeon*); Bambesa, 10.iv.1937, 1 ♀ (*J. Vrydagh*); Sankuru, M'Pemba Zeo, 13.xii.1959, 1 ♀ (*D. R. Marechal*); Kabinda, 1935, 1 ♀ (*P. Henrard*); Lulua, Kapanga, x. 1932, 1 ♀ (*F. G. Overlaet*); Katanga, Lubombo, ix. 1928, 1 ♀ (*C. Seydel*); Kasongo, ix. 1959, 1 ♀ (*P. L. G. Benoit*) (MRAC); Elizabethville, iv. 1935, 1 ♀ (*F. de Loose*) (NMR).

#### *Atopopompilus jacens* (Bingham) **comb. n.**

(Text-figs 8, 13, 20, 28)

*Pompilus jacens* Bingham, 1912 : 560. Holotype ♂ (not ♀ as originally stated), RHODESIA (UM, Oxford) [examined].

*Paracyphononyx parallelus* Haupt, 1929 : 168. Holotype ♀, SOUTH AFRICA (MNHU, Berlin) [examined]. **Syn. n.**

*Paracyphononyx coloratus* Haupt, 1929 : 168. LECTOTYPE ♂, CAMEROUN (MNHU, Berlin), here designated [examined]. **Syn. n.**

[*Paracyphononyx carinatus* (Radoszkowski) sensu Arnold, 1936 : 443; ♂. Misidentification.]

*Atopopompilus marshalli* Arnold, 1937 : 24. Holotype ♀, RHODESIA (TM, Pretoria) [examined].

#### **Syn. n.**

*Atopopompilus parallelus* (Haupt) Haupt, 1950 : 58; ♀.

*Atopopompilus coloratus* (Haupt) Haupt, 1950 : 58; ♀.

**LECTOTYPE DESIGNATION.** *Paracyphononyx coloratus* Haupt. This species was described in the couplets of keys to females and males of species of *Paracyphononyx*.

A female and a male in the collections of the MNHU, Berlin bear Haupt's determination labels 'Paracyphononyx coloratus Haupt det. Haupt 1928'. Neither bears any form of 'type' label. The female is labelled 'Kamerun' and agrees with the short description. The male agrees with the short description, and with fig. 41 in the text of Haupt's paper, showing the head in facial view. A putative second male specimen is indicated by the citation of a range of measurements of body length (10-11 mm.). Records of MNHU indicate that a 'type' specimen of *P. coloratus* should be deposited in the collections, but Dr Königsman of that institution is unable to trace other material. I am satisfied that the female and male I have seen were before Haupt when he described this species; since a male has been figured, I have labelled, and here designate as lectotype, the male specimen. Should a further male specimen of this species come to light, bearing Haupt's determination label, it should be treated as a paralectotype of *P. coloratus*.

♀. Length 9-17 mm. Black; antennae, head, part or all of pronotum, mesonotum, scutellum, tibiae and tarsi, sometimes also parts of femora, yellow-brown to red-brown, quite variable; occasionally (northern populations) face and pronotum substantially yellow. Erect hairs often quite long, intermediate between *A. carinatus* and *A. kilimandjaroensis*. Pubescence mostly brownish, occasionally silvery on face.

Antennal segments long, at least 4 × as long as wide. Head short, broad, inner orbits converging above and below (Text-fig. 8). SMC<sub>3</sub> narrowed above, normally half as long on radial vein as is SMC<sub>2</sub>. Propodaeum declivous but not abruptly so, posterior corners flattened but not strongly so (Text-fig. 13); short erect hairs of propodaeum not markedly adpressed, but backwardly directed.

♂. Length 8-12 mm. Black; with more or less red-brown coloration on head, pronotum, mesonotum, scutellum, and coxae; antennae and legs always so. Always with some yellow coloration behind eyes on temples, posterior pronotal margin, and on dorsal surface of hind tibia. Yellow may replace red-brown extensively on face and clypeus, pronotum, fore legs and tarsi. Wings largely hyaline with infuscate margins. Pubescence extensive, silvery, also much erect silvery hair; propodaeum, save spiracular area, largely so covered. Seventh tergite white.

Antennae (Text-fig. 28) short, stout, each segment with sharp ventral angle when viewed in profile. Face with well-marked carina extending onto clypeus. Eyes convergent above and below, but UID clearly exceeds LID. Genitalia as in Text-fig. 20.

All the new taxa described in Bingham's posthumously published paper (1912) were designated 'form n.'. *A. jacens* has thus on occasion been recorded as '*P. festivus* f. '*jacens*', since *P. festivus* Klug was the immediately preceding species dealt with by Bingham. Arnold erroneously determined *A. jacens* as *P. carinatus*, and recorded *P. jacens*, *P. nasutus* and *P. personatus* as synonyms. The types of *P. jacens* and *A. marshalli* are both part of a series of specimens collected by G. A. K. Marshall in Salisbury and dispersed to Oxford, Bulawayo and London.

DISTRIBUTION. Widely distributed through parts of the woodland and savanna regions of Africa; summarized on Map 1, p. 60.

VARIATION. Males from southern Africa exhibit least red and yellow coloration on head and thorax. The extent of areas so coloured increases clinally in a northwards direction; thus, males from Cameroun and Nigeria are most extensively marked with red and yellow. Females from the most northern part of the range (Sudan, Cameroun, Nigeria) also have a tendency towards replacement of red-brown

by yellowish colour, particularly on the head and pronotum. The type-material of *P. coloratus* is of this extreme colour form.

#### MATERIAL EXAMINED.

*Pompilus jacens* Bingham, holotype ♂, RHODESIA: Salisbury, x.1899 (*G. A. K. Marshall*) (UM, Oxford). *Paracyphononyx parallelus* Haupt, holotype ♀, SOUTH AFRICA: Natal, no further data (MNHU, Berlin). *Paracyphononyx coloratus* Haupt, lectotype ♂, CAMEROUN: Bosum, 21-31.v.1914 (*Tessmann*) (MNHU, Berlin). *Atopopompilus marshalli* Arnold, holotype ♀, RHODESIA: Salisbury, iv. 1900 (*G. A. K. Marshall*) (TM, Pretoria).

CAMEROUN: Bosum, 1-10.vi.1914, 1 ♀ (*Tessmann*); ? Odessi, 5.v.1904, 1 ♀ (paralectotype of *P. coloratus*) (MNHU). KENYA: Mombasa Island, xi. 1911-iii. 1912, 1 ♀ (paratype of *A. marshalli*); Rabai, viii. 1930, 9 ♂; viii. 1937, 1 ♂ (*van Someren*); Diani Beach, ix. 1951, 1 ♂ (*N. L. H. Krauss*); Tanger province, ix. 1950, 1 ♂ (*R. C. H. Sweeney*); Ukumbani, Nzoi, i-ii. 1889, 1 ♀, 1 ♂ (BMNH). MALAWI: Valley of N. Rukuru, Karonga district, 2000-4000', 15-18.vii.1910, 1 ♀ (*S. A. Neave*) (paratype of *A. marshalli*) (NMR). NIGERIA: Yola, 1 ♂ (*L. N. Lee*); Kano, Azare, 4.ix.1925, 1 ♀ (*L. Lloyd*) (BMNH). RHODESIA: Salisbury, 1 ♀ (*G. A. K. Marshall*) (paratype of *A. marshalli*) (NMR); Salisbury, i-iv. 1900, 2 ♀, 1 ♂; xi. 1903, 1 ♂; i. 1905, 1 ♀ (*G. A. K. Marshall*); Shangani, de Beer's ranch, v. 1932, 1 ♂ (*J. Ogilvie*) (BMNH); S. Rhodesia, 9.xi.1935, 1 ♂ (*R. H. R. Stevenson*) (NMR); Matopos National Park, in Malaise trap, 1-2.iv.1968, 2 ♂ (*P. J. Spangler*) (USNM). SENEGAL: Dakar, 1907, 1 ♀ (*Waterlot*) (MNHN). SIERRA LEONE: no further data, 2 ♀ (*Moquerys*) (MNHN); Freetown, Tower Hill, iii. 1908, 1 ♂ (*A. Pearse*) (BMNH). SOUTH AFRICA: Algoa Bay, 31.iii.1892, 1 ♀, 1 ♂ (*H. Brauns*) (♀ paratype of *A. marshalli*) (TM); Grahamstown, Strowan, 19.ii.1967, 1 ♀; 26.ii.1967, 1 ♂; 21.i.1968, 1 ♀, 10.iii.1968, 1 ♀, 1 ♂; 17.iii.1968, 1 ♀; 31.iii.1968, 1 ♂ (*C. Jacot-Guillarmod*); Grahamstown, Hilton, 9.iv.1967, 1 ♀ (*C. Jacot-Guillarmod*); Grahamstown, 17-25.i.1970, 1 ♂ (*J. G. H. Londt*); Grahamstown, Belmont Valley, 20.i.1970, 1 ♂; 26.i.1970, 1 ♂ (*F. W. Gess*); Kenton-on-Sea, in Malaise trap, iii. 1971, 1 ♀ (*R. A. Jubb*); Howison's Poort, in Malaise trap, 1-7.ii.1972, 1 ♀ (*F. W. Gess*) (AM); Transvaal, 5 miles W. of Warmbad, 24-25.ii.1968, 1 ♂ (*Krombein & Spangler*) (USNM). SUDAN: West Darfur, N. Jebel Murra, Killing, 29.vi.1932, 2 ♀ (*M. Steele*) (BMNH). TANZANIA: Stigi, x. 1917, 1 ♂ (*G. D. H. Carpenter*) (BMNH). ZAIRE: Elizabethville, 21.v.1923, 2 ♂ (*M. Bequart*) (MRAC); Kabinda, Lomami, 1 ♀ (*J. Muller*) (IRSNB); Coquilatville, 1 ♀ (NMR). ZAMBIA: Upper Luangwa River, 27.vii.-13.viii.1910, 1 ♀ (*S. A. Neave*) (paratype of *A. marshalli*); 16°S., 26°E., 25.viii.1967, 1 ♀ (BMNH).

#### *Atopopompilus nefas* (Dalla Torre)

(Text-figs 7, 16, 21, 26, 34)

*Salix collaris* Saussure, 1891: 263. Holotype (?) ♀, MADAGASCAR (originally in MHN, Geneva, but not located and presumed lost).

*Salius* (*Schistosalius*) *collaris* Saussure; Saussure, 1892 : 322; ♀.

*Pompilus nefas* Dalla Torre, 1897 : 304. Replacement name for *Salius collaris* Saussure, 1891, junior secondary homonym in *Pompilus* of *Sphex collaris* Fabricius, 1775.

*Paracyphononyx nefas* (Dalla Torre) Haupt, 1929 : 168; ♀, ♂.

*Psammoderes collaris* (Saussure) Banks, 1941 : 353; ♀.

*Atopopompilus nefas* (Dalla Torre) Haupt, 1950 : 56; ♀.

TYPE-MATERIAL. *Salius collaris* Saussure. The original description of the female clearly applies to this distinctive species, but Saussure did not indicate whether he saw more than one specimen. He gives a length of 17 mm. Two very similar females, both more than 20 mm in length, but otherwise agreeing well with the description, are in the collections of the MHN, Geneva; there is some ambiguity in the attached labels of one specimen. Both bear blue printed labels, 'NOSSI BE', and a second label, printed 'Madagascar' above handwritten 'H. de Saussure'. One female also bears a label in Saussure's hand, '*Salius collaris* ♀ Ss', and a pink printed label, 'Madagasc. Antananarivo'. In 1892, Saussure gave a more detailed description of *S. collaris*, and recorded the species from Antananarivo. Saussure wrote 'Capturée dans la région d'Antananarivo', and I believe his use of the singular denotes a single specimen rather than the species.

Both females are mounted on thick pins. Saussure's handwritten label also has pinholes smaller than those made by the thick pin of the specimen currently bearing this label.

I believe it probable that the holotype was badly damaged and discarded at some time in the past; as a matter of continuity of interpretation, some person perhaps attached the labels to a more satisfactory conspecific specimen which, however, probably postdates description. I have glued the pertinent labels to a separate card, to preserve them in their present state. I presume the holotype to be permanently lost. However, Saussure's figure (1892: pl. 23, fig. 13) is quite sufficient to identify the species satisfactorily.

♀. Length 11–22 mm. Black; head except mouthparts, most of pronotum, occasionally mesonotum and scutellum orange-brown to dark red-brown. Erect hairs of face and pronotum much as in other species of the genus, but substantially reduced on rest of thorax. Pubescence dark, sometimes reflecting obscurely violaceous or blue; with a little silvery adpressed pubescence on propodaeum, frequently lost.

Antennal segments fairly thick, second flagellar segment approximately 4 × as long as thick. Inner orbits converging above and below, but much less strongly so above than in Ethiopian species (Text-fig. 7). SMC<sub>3</sub> narrowed above, but configuration of SMC<sub>2</sub> and SMC<sub>3</sub> very variable. Propodaeum distinctively modified (Text-fig. 16), with a pair of bluntly pointed postero-lateral prolongations and a shallow median longitudinal impression. Sides of propodaeum almost parallel, very slightly constricted in between spiracle and posterior prolongation.

♂. Length 11–15 mm. Black; head (except mouthparts and, occasionally, ocellar region), frequently pronotum, and occasionally mesonotum and scutellum, light or dark red-brown. Erect hair and pubescence mostly black, but silvery on lower face and coxae, occasionally silvery or brownish on propodaeum. Wings fuscous with darker margin.

Antennae roundly crenulate below (Text-fig. 26). Facial carina reaches onto clypeus, but does not fork (Text-fig. 34). Inner orbits not strongly convergent above, sub-parallel below, UID clearly exceeds LID. Propodaeum with distinct declivity and lateral prolongations as in female, but less strongly so. Erect hair of propodaeum quite marked, but much less dense than on Ethiopian species. Genitalia as in Text-fig. 21.

The name *Salinus collaris* is permanently rejected under Article 59(b)(i) of the *International Code of Zoological Nomenclature*, as amended on 30 September, 1972.

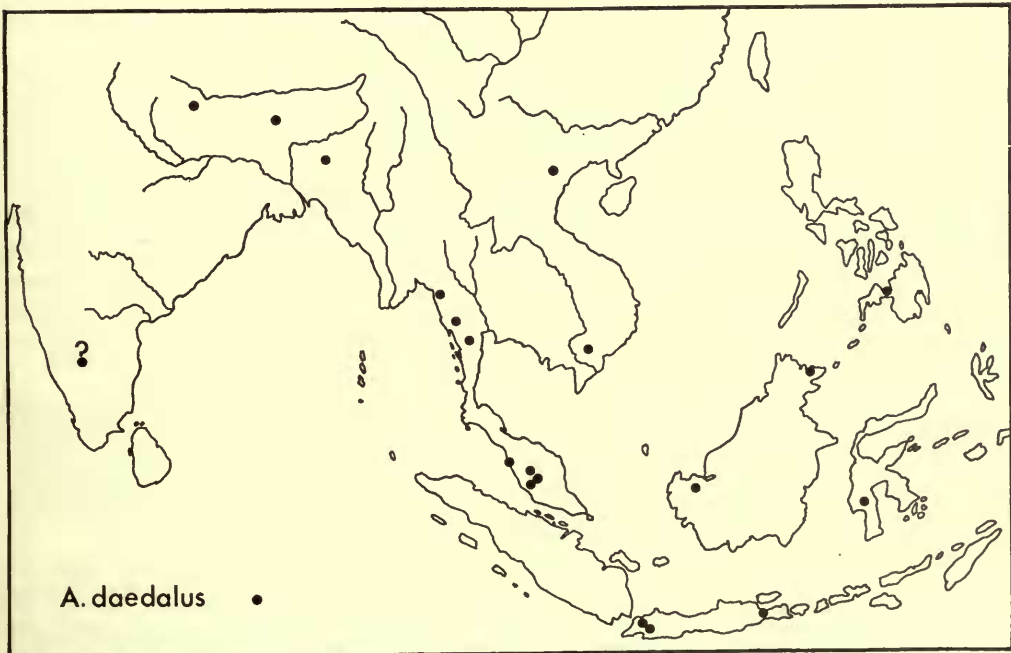
Haupt (1929) correctly identified the male of *A. nefas*. However, Arnold did not include the Madagascan fauna in his works, and was not familiar with this species.

**DISTRIBUTION.** Madagascar; summarized on Map 1, p. 60.

**VARIATION.** *A. nefas* is a variable species, with no strong geographic component in its variation. Specimens with extensive orange-brown coloration on head and thorax occur sympatrically with others which have the areas of coloration substantially reduced and the colour deepened to dark red-brown. In addition, morphological characters such as the shape of the face and the form of the submarginal cells are noted to vary quite widely. I cannot, however, find any basis for recognition of undescribed taxa in the material available for study; although selected individuals may superficially appear quite different, intermediates can always be found.

**MATERIAL EXAMINED.**

MADAGASCAR: Betsilei, 1880, 3 ♂ (*D. Cowan*) (BMNH); Tananarive, 1914, 1 ♂; 1916, 1 ♀; 1919, 1 ♀ (*Waterlot*) (MNHN); Tananarive, 1 ♂ (*Plason*) (MRAC); Tananarive, 1 ♂ (*Sikora*) (MNHU); Manjakatampo, 3.i.1958, 1 ♀ (*F. Keiser*); Antisabe, 15.i.1958, 1 ♀ (*F. Keiser*) (NM); Tzimbazaza, 19.xi.1947, 1 ♂ (ISM); Ambalavao, ix-x. 1938, 1 ♀ (*C. Lambertson*) (USNM); Joffreville, 8.v.1958, 1 ♂



MAP 2. Distribution of *Atopopompilus* in the Oriental region.

(*Keiser*) (NM); Antanambe, 1 ♀ (USNM); Ambohimaso, Tsarafidy Forest, 1450 m, xii. 1959-i. 1960, 1 ♀ (*P. Griveaud*) (ISM); Ambatolampy, 1931, 2 ♀ (*Lasere*) (MNHN); Ambatolampy, 1.1.1958, 1 ♀ (*Keiser*) (NM); Fianarantsoa, Anosimparihy, 9.viii.1958, 1 ♀ (*Keiser*) (NM); Ranomafana, 21.1.1958, 1 ♀; 10-11.ix.1958, 2 ♂ (NM & coll. Wahis); Rogez, v. 1936, 1 ♀; iv. 1937, 3 ♀ (*A. Seyrig*) (MNHN); Rogez, Analandrakaka, vi. 1937, 1 ♂ (*A. Seyrig*) (coll. Wahis); near Rogez, 900 m, 1946, 2 ♀ (*C. Lambertson*) (USNM & coll. Wahis); Perinet, 500 m, 6-12.v.1968, 1 ♀ (*K. M. Guichard*) (BMNH); Perinet, no further data, 1 ♀ (ISM); Perinet, xii. 1957-x. 1958, 4 ♀, 3 ♂ (*Keiser*) (NM); Moramanga, 9.x.1958, 2 ♀ (*Keiser*) (NM); Ambohimombo, 1894, 1 ♀ (*Forsyth-Major*) (BMNH); Inosy, ii. 1933, 1 ♂ (*A. Seyrig*) (MNHN); Tulear, Sakaraha, 12.iii.1958, 1 ♀ (*Keiser*) (NM); Fort Dauphin, 1913, 1 ♀ (*Gruvel*) (MNHN); Nossi Be, 2 ♀ (MHN); no further data, 1919, 2 ♀ (*J. de Gaulle*) (MNHN & coll. Wahis).

*Atopopompilus daedalus* (Bingham) **comb. n.**

(Text-figs 3, 4, 14, 22, 24, 29, 30)

*Pompilus daedalus* Bingham, 1896 : 429. LECTOTYPE ♀, BURMA (BMNH), here designated [examined].

*Anoplius styruis* Cameron, 1903 : 327. Holotype ♂, INDIA (BMNH) [examined]. **Syn. n.**

*Ceropales pruinosa* Cameron, 1905 : 415. LECTOTYPE ♂ (not ♀, as originally stated), INDIA (UM, Oxford), here designated [examined]. **Syn. n.**

[*Anoplinellus clotho* (Smith) sensu Banks, 1934 : 84; ♀. Misidentification.]

*Anoplinellus* undescribed sp.; Banks, 1934 : 84; ♀.

*Anoplinellus javanus* Haupt, 1935 : 318. LECTOTYPE ♀, JAVA (NM, Basle), here designated [examined]. **Syn. n.**

LECTOTYPE DESIGNATIONS. (1) *Pompilus daedalus* Bingham. The description cites 'Sikkim; Tenasserim', as localities, and gives a range of measurements. Six conspecific females in the BMNH collections are from three localities in Tenasserim, Burma; from Sikkim; and from Darjeeling. All are originally from the Bingham collection. Two bear labels in Bingham's handwriting, one 'Pompilus daedalus Bingham ♀ Type' and the other 'Pompilus daedalus Bingham ♀'. The specimen labelled 'type' has 'the antennae, tibiae and tarsi dull piceous red' and thus agrees best with the description, since the other females are more nearly black. I have labelled, and here designate as lectotype, the female which bears Bingham's type label.

(2) *Ceropales pruinosa* Cameron. A male bearing Cameron's label, 'Ceropales pruinosa Cam. type' stands next to a second male in the Rothney collection in UM, Oxford. Although the description states '♀', both males fit the description well, and it can only apply to this sex. I have labelled, and here designate as lectotype, the male which bears Cameron's type label.

(3) *Anoplinellus javanus* Haupt. Haupt lists two females from Gedeh after his description, and states '1 ♀ in meiner stammlung [*sic*]'. This specimen, now in the ZM, Halle, bears Haupt's 'cotype' label, and is conspecific with the female in NM, Basle, which bears Haupt's holotype label. Both agree well with the description. I have labelled, and here designate as lectotype, the Basle specimen.

♀. Length 11–20 mm. Black; wings infusate with darker margin; some populations with small more or less hyaline areas in forewing, more so in hind wing. With extensive silver or grey pubescence, particularly silver on face, thorax and coxae, more greyish on anterior of tergites. Otherwise brown pubescent. Erect hair of head and thorax extensive, very long, exceeding thickness of scape.

Antennae particularly elongate, thin, second segment of flagellum at least  $5.0 \times$  as long as wide. Front very narrow, MID about  $0.5 \times$  TFD in smaller specimens, less in larger specimens. Vertex in facial view below level of eyes in large specimens. Inner orbits strongly convergent above and below (Text-fig. 4). Thorax typical of genus; propodaeum similar to that of *A. carinatus*, but shorter; declivity more concave (Text-fig. 14), with a central area of aciculation; lateral angles more or less flattened at 45 degrees or slightly protuberant dorsally. Dorsum and lateral angles with abundant, tangled brown-silver pubescence in addition to long erect hairs. SMC<sub>3</sub> narrowed above, normally much shorter on radial vein than is SMC<sub>2</sub>, and approximately equal to or shorter than SMC<sub>2</sub> on cubital vein.

♂. Length 8–12 mm. Black; ventral surface of scape, most of clypeus, facial carina, lines bordering inner orbits and temples, posterior pronotal margin, and spot on dorsal surface of hind tibia, yellow. Antennae sometimes reddish ventrally; seventh tergite sometimes with white spot. With much silvery erect hair, especially dense on posterior third of propodaeum; silvery pubescence widely distributed, merging to greyish on anterior halves of tergites. Wings fuscohyaline with infusate margins.

Antennae (Text-fig. 24) short, each segment with sharp ventral angle when viewed in profile. Facial carina just reaches upper margin of clypeus (Text-figs 29, 30), otherwise very similar to *A. carinatus*. Genitalia as in Text-fig. 22.

This distinctive species is sole representative of its genus in the Orient. All the names in the above synonymy were proposed in works of limited scope which simply described new taxa.

Surprisingly, specimens in collections have often been misdetermined as various of the nominal species which are synonyms of *Anoplius* (*Orientalanoplius*) *canifrons* Smith, 1855. It would appear that *A. daedalus* has often been taken together with this species of *Anoplius*, but in fewer numbers; cursory examination of series must have resulted in failure to segregate these females, which have a similar colour pattern.

*Ceropales* (and Ceropalidae) was used by Cameron in 1905 to replace *Pompilus* (and Pompilidae) which at that time was thought to be preoccupied in the Octopoda.

DISTRIBUTION. Forest areas of the Oriental and Indonesian regions; summarized on Map 2, p. 65.

VARIATION. Size variation produces minor allometric differences. For example, larger females have the face and vertex sunk beneath the contour of the eyes, whilst smaller females have the face more nearly in the same plane as the surface of the inner orbits; thus, the eyes of large specimens appear to bulge when compared with those of smaller females.

The Javan population does not have uniformly infusate wings in the female.

#### MATERIAL EXAMINED.

*Pompilus daedalus* Bingham, lectotype ♀, BURMA: Tenasserim, Thaungyin Valley, vi. 1894 (*C. T. Bingham*) (BMNH). *Anoplius styrus* Cameron, holotype ♂, INDIA: Sikkim? (BMNH). *Ceropales pruinosa* Cameron, lectotype ♂, INDIA: Khasia Hills

(*Rothney*) (UM, Oxford). *Anoplinellus javanus* Haupt, lectotype ♀, JAVA: Tjibodas, Gedeh, 1400–1600 m, viii. 1931 (*Handschin*) (NM, Basle).

BORNEO: Sandakan, 1 ♀ (*C. F. Baker*) (MCZ); Sarawak, Mt Dulit, 4000', moss forest, 16.x.1932, 1 ♀ (*B. M. Hobby* & *A. W. Moore*) (misdet. 'Orientanoplius iliacus, Haupt, 1937'), (BMNH). BURMA: Tenasserim, Tavoy Valley, iii. 1893, 1 ♀ (paralectotype of *P. daedalus*); Maulmain, v. 1889, 1 ♀ (paralectotype of *P. daedalus*); Thaugyin Valley, vi. 1894, 1 ♂ (*C. T. Bingham*) (BMNH). INDIA: S. India, no further data, 1 ♀ (*C. T. Bingham*); Sikkim, Runjit Valley, iv. 1894, 2 ♀ (paralectotypes of *P. daedalus*); Darjeeling, 7000', 31.iii.1894, 1 ♀ (*C. T. Bingham*) (paralectotype of *P. daedalus*); Khasia Hills, 6 ♀ (BMNH); Khasia Hills, 1 ♀ (*Rothney*) (UM). JAVA: Tjibodas, Gedeh, 1400–1600 m, viii. 1931, 1 ♀ (*Handschin*) (paralectotype of *A. javanus*) (ZM); same data, v. 1935, 1 ♀, 1 ♂ (*V. d. Vecht*) (MCZ); same data, 1 ♀, 1 ♂ (*Vecht*) (NMR); Mt Djampang, Tjigaeha, i–ii. 1938, 6 ♀; Salatry, xi. 1937, 1 ♀; i. 1938, 1 ♀; Gunung Malang, 3000–4000', x. 1937, 2 ♀; East Java, Tengger Highlands, 1100 m, v. 1938, 3 ♀; Soekaboemi, i. 1938, 1 ♀ (*K. M. Walsh*) (BMNH). NEPAL: Gum and Lumsa, 7000', 27.viii.1952, 1 ♂ (*BM Expedn to Nepal*) (BMNH). NORTH VIETNAM: Hoa Binh, 1926, 1 ♂ (*A. de Cooman*) (MNHN); Hoa Binh, viii. 1918, 1 ♀ (*R. V. de Salvaza*) (BMNH). PHILIPPINE ISLANDS: Mindanao, Iligan, 1 ♀ (*C. F. Baker*) (USNM). SIAM?: Biserat, 1 ♀ (BMNH). SOUTH VIETNAM: Tay Ninh, 20.xii.1923, 1 ♀; 10.xi.1924, 1 ♀; 29.xi.1924, 1 ♀ (*R. V. de Salvaza*) (IRSNB). SULAWESI: Latimodjong Mts, Bontoe Batoe district, 4000', v. 1931, 2 ♀ (*C. F. Clagg*) ('undescribed species' of Banks, 1934) (MCZ). WEST MALAYSIA: Pahang, Fraser's Hill, 20.vii.1936, 1 ♀; Pahang, Cameron Highlands, Ginting Kial, 5000', 18.vii.1938, 1 ♂; 22.v.1939, 1 ♀; 27.v.1939, 1 ♀, 1 ♂; 4700'–5100', 12.v.1939, 1 ♀; Selangor, Kuala Sleh, 17.v.1936, 1 ♀; Bukit Kutu, 3500', 9.ix.1929, 1 ♀ (*ex colln Fed. Malay States Mus.*) (BMNH); Cameron Highlands, Rhododendron Hill, 1.x.1935, 1 ♀; Penang, Ayerltam Reservoir, 8.viii.1968, 1 ♀ (*H. T. Pagden*) (BMNH).

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## INDEX

Synonyms and invalid names are in *italics*.

- |                          |                        |
|--------------------------|------------------------|
| <i>affinis</i> , 55      | <i>jacens</i> , 61     |
| <i>Anoplinellus</i> , 49 | <i>javanus</i> , 66    |
| Anoplius, 51, 66         | kilimandjaroensis, 59  |
| Arachnophroctonus, 51    | <i>marshalli</i> , 61  |
| Atopopompilus, 51        | melanicrus, 47         |
| Batozonellus, 52         | <i>mlanjensis</i> , 59 |
| <i>brunipes</i> , 58     | nasutus, 58            |
| canifrons, 67            | nefas, 63              |
| carinatus, 51, 54        | Paracyphononyx, 47, 52 |
| Ceropales, 66            | <i>parallelus</i> , 61 |
| clotho, 49               | <i>personatus</i> , 59 |
| <i>collaris</i> , 63     | <i>pruinosa</i> , 66   |
| <i>coloratus</i> , 61    | relativus, 49          |
| crassicornis, 57         | <i>styryus</i> , 66    |
| daedalus, 66             | <i>venans</i> , 51, 55 |
| Episyron, 52             |                        |
| festivus, 62             |                        |

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